

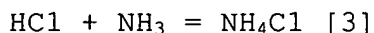
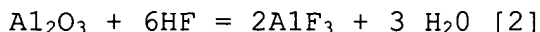
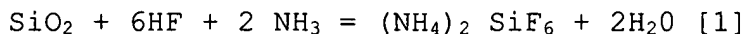
REMARKS

Upon reviewing the Official Action, the review indicates that the claims, as presently amended, now recite patentable subject matter and should be allowed. Accordingly, reconsideration and allowance are respectfully requested.

In advance of addressing the grounds on which the rejections are based, a summarization of the improved integrated metal etch tool structure for removing post-RIE polymer rails from Al/Cu metal lines of a semiconductor structure will be provided to better define the integrated metal etch tool structure within the requirements of 35 USC 112, sixth paragraph and to draw a clearer distinction between the invention structure and those contained in the cited references.

In the prior art of making semiconductor structures in which it is necessary to remove post-RIE polymer rails that are formed on a Al/Cu metal line, applicants have invented an integrated metal etch tool interfaceable with vacuum and deionized water rinse chamber means or strip, vacuum and deionized water rinse chamber means that removes sidewall polymer rails left behind after the metal (Al/Cu) RIE process.

The inventive structure strip, vacuum, and deionized water rinse chamber means interfaced with the metal etch tool performs the chemical reaction functions of:



(either post resist strip or prior to resist strip), to allow the products from both etching and neutralization reaction to be soluble in deionized water.

The manner in which applicants' claims are construed in regard to the means-plus-function criteria of paragraph 6 of 35 USC §112 have been noted; however, applicants have amended claims 13 and 16 in an earnest attempt to satisfy the three-prong analysis test relied upon in the Office Action.

Section 112, paragraph 6, states that a means-plus-function claim (shall be construed to cover the corresponding structure... described in the specification." (emphasis added). In this regard, the Federal Circuit holds that, pursuant to this provision, structure disclosed in the specification is "corresponding" structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim. This duty to link or associate structure to function is the *quid pro quo* for the convenience of employing section 112, Par. 6. Braun Medical Inc. v. Abbott Laboratories, 124 F.3d 1419, 43 U.S.P.Q. 2d 1896, 1900 (Fed. Cir. 1997), citing O.I. Corp. v. Tekmar Co., 115 F.3d 1576, 1583, 42 U.S.P.Q.2d 1777, 1782 (Fed. Cir. 1997).

The amendment of claims 13 and 16 is such as to dispel any construction of these claim not in compliance with the strictures of 35 USC §112, ¶6.

Claims 13-17 were rejected as being anticipated by Kawasaki et al. under 35 USC 102(b).

Applicants respectfully traverse the rejection and request reconsideration for the following reasons hereafter set forth.

A review of Kawasaki et al. shows that it only disclose a method of removing residual corrosive compounds by plasma etching and washing. The apparatus therefor (see col. 3 lines 22-44) essentially comprises eight parts - however, the apparatus lacks a metal etch tool interfaceable with strip chamber means, vacuum chamber means and water rinse chamber means to remove soluble material in deionized water.

For these reasons, Kawasaki et al. fails to anticipate the claims as amended.

Withdrawal of the rejection is respectfully requested.

Claims 13-15 were rejected as being anticipated by Okutani under 35 U.S.C 102(b).

Applicants respectfully traverse this rejection and request reconsideration for the reasons which follow.

A close review of Okutani reveals that it only disclose a method of and apparatus for producing semiconductor devices. These apparatuses for producing semiconductor devices incorporates a dry processing mechanism and a wet processing mechanism for the wafers, and a carriage mechanism to reduce the space for the apparatus for dry-processing and wet-processing. Significantly, there is no reference to or mention of, the need for apparatus to remove the products of etching and products from neutralization of the etchings to prevent the sidewalls from trapping chlorine and water species. Therefore it is hardly surprising that Okutani's apparatus lacks an integrated metal etch tool interfaceable with strip, vacuum and rinse chamber means to remove the etchant reaction products and the neutralization of those etchant products, both of which are soluble, in a deionized water rinse chamber.

Accordingly, Okutani fails to anticipate claims 13 to 15 as presently amended.

Withdrawal of the rejection is respectfully requested.

Claims 16 and 17 were rejected as being anticipated by Chen et al. under 35 U.S.C. 102(b).

Applicants respectfully traverse this rejection and request reconsideration for reasons which follow.

A review of Chen et al. shows that it only disclose a vacuum chamber for passivating and stripping to inhibit corrosion of a semiconductor substrate, wherein the chamber strips the polymeric remnant resist remaining on the substrate. Admittedly, mere conventional processing equipment is used (see col. 3, lines 17-19) to passivate and strip the substrate. In fact, FIG. 2 of Chen et al. is revealing as the most comprehensive depiction of its vacuum chamber arrangement. Notably absent from the text describing FIG. 2 is any reference to or mention of, an integrated metal etch tool interfaceable with vacuum chamber means and strip chamber means, as those now recited in applicants' claims as amended.

For these reasons Chen et al. fails to anticipate the claims as presently amended.

Withdrawal of the rejection is respectfully requested.

Claims 16 and 17 were rejected as being anticipated by Davis et al. under 35 U.S.C. 102(b).

Applicants respectfully traverse this rejection and request reconsideration for the reasons hereinafter provided.

Careful scrutiny of Davis et al. shows that it disclose apparatus for transferring work pieces such as integrating circuits. The apparatus comprises:

- (a) a vacuum carrier having a sealable carrier door and capable of maintaining a vacuum with the workpieces therein, the carrier door movable between an open and close position;
- (b) a chamber adapted to receive the carrier and selective move and carrier door and having a closeable port; the chamber capable of maintaining an applied vacuum;
- (c) a moveable arm located within the chamber and capable of engaging the workpieces, the arm moveable into the carrier and through the port to transfer the workpieces;
- (d) a transfer mechanism located exterior to the chamber and adapted to transfer the workpieces from the arm to a non-vacuum processing station; and
- (e) a control system selectively applying vacuum and ambient pressure to the chamber.

Although Davis et al. disclose a multi-chamber apparatus, this apparatus clearly lacks chamber means to perform semiconductor structure chemistry (removal of etchant and neutralization products) to permit a final rinse step using only deionized water.

It is a fact that Davis et al. clearly lacks the apparatus combination of either the vacuum and rinse chamber means interfaceable with a metal etch tool as required in claims 16-17.

For these reasons, Davis et al. fails to anticipate applicants' claims as presently amended.

Withdrawal of the rejection is respectfully requested.

The Official Action notes regarding claim interpretation (which is a matter of law for a district court or the CAFC) are misplaced, as it is error to regard the functions of apparatus as a method limitation, since the 6th paragraph of 35 U.S.C. §112 clearly permits means plus function language to be includable in a claim as a necessary and indispensable condition to satisfy the "means plus function" requirements.

The foundation for this necessity is clearly shown in applicants' specification on page 8, lines 21-24 where it is stated that, if the etchant and neutralization reactions do not occur in the vacuum chamber, the sidewall can trap chlorine and water species - thereby resulting in a corrosion cycle where the chlorine acts as a catalyst. In that case, reactions 4 and 5 (as shown on page 8, lines 25-28) will occur. The novel arrangement of applicants' integrated metal etch tool interfaceable with the vacuum and strip chambers in claims 16 and 17 do not permit the small time window between metal RIE and the sidewall removal which would allow corrosion to transpire. Furthermore, the low reaction pressure (under 10 m Torr) enables the H₂O reaction product to escape. Additionally, the low reaction pressure also enables easy integration of the chamber designed to carry out reactions 1-3 with the metal RIE process tool.

As is abundantly made clear in applicants' specification on page 9, the vacuum chamber may be interfaced with the metal etch tool or left as a stand-alone chamber for introducing the reaction mixture; however, applicants have recited the most effective arrangement, which is the vacuum chamber interfaced with the metal etch tool.

Davis et al. clearly lacks any reference to or mention of such an arrangement.

Note is taken of the objections raised to claims 13 and 16; however, in view of the amendments made deleting "I", these objections are no longer applicable.

In view of the foregoing amendments, remarks and arguments, it is believed that the application is now in condition for allowance and early notification of the same is earnestly solicited.

Respectfully submitted,



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